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Another similarity with the *Oenothera* situation is that in this *Drosophila* race there would occasionally appear recessive mutants on one of these two "lethal chromosomes." These recessive mutants, however, could not become manifest on account of the enforced heterozygosity. They could only become manifest when crossing over occurred and homozygosity was thus made possible. "As crossing over occurs with predictable frequencies, those individuals showing characters abnormal to the stock were thrown continually in a definite, very small percentage of cases." In just such a regular, although small, percentage of cases does *Oenothera Lamarckiana* throw its mutants. MULLER concludes that the *Oenothera* situation is to be explained by a similar mechanism, "but probably the lethal effect in *Oenothera* is on the gametes rather than on the zygote."

A similar idea appears in a paper by DAVIS,⁶ in which we find summarized some of the evidence, old and new, on the suspected hybrid condition of *Oenothera Lamarckiana*. The regularity with which the same old mutants are thrown and the production of twin hybrids in crosses suggest to this author the hybrid condition of *O. Lamarckiana*. The facts that about one-half of both pollen and ovules, in random distribution, are sterile, and that only 30-40 per cent of the seeds produced are fertile, suggest that only such gametes and zygotes are fertile as will reproduce the hybrid type. The argument is essentially similar to that of MULLER. "If it could be shown that in every group of 4 pollen grains (tetrad) formed as the result of the reduction mitoses only 2 grains are perfect, the conclusion would be justified that pollen sterility was the result of this segregation division." The author regards this as impossible, however, since abortion takes place after the tetrads have lost their identity. On this point we may quote from a review which appeared in this journal⁷ on some work of GEERTS. "In *Oenothera Lamarckiana* 50 per cent of the ovules are found to degenerate and about 50 per cent of the pollen grains, *two from each tetrad of spores*."

It begins to look more and more probable that our classic illustration of mutation is really about the most unfavorable material that could have been chosen for the subject, owing to its germinal complexities. This complexity and seeming lack of conformity have served to make "*Oenothera* genetics" a science in itself. Geneticists will feel relieved when these data on *Oenothera* are finally interpreted by the Mendelian system, and there is now much hope that this may soon come to pass.—MERLE C. COULTER.

Edible and poisonous mushrooms.—Popular interest in the fleshy fungi appears to be growing in many sections of the country. This interest may be attributed to several different causes, chief of which are to be found in the

⁶ DAVIS, B. M., A criticism of the evidence for the mutation theory of DE VRIES from the behavior of species of *Oenothera* in crosses and in selfed lines. Proc. Nat. Acad. Sci. 3:704-710. 1917.

⁷ BOT. GAZ. 47:481. 1909.

availability of these plants as subjects for nature study and in the desire to add to the dietary a wholesome and palatable food growing without cultivation in forest and field. Here it is almost totally wasted as an article of food, because the comparatively small number of poisonous species cannot be distinguished from the many edible ones, for lack of the elementary knowledge necessary to recognize the more common forms. For this reason, and particularly at this time when there is a worthy desire to conserve every available item of food, nutritious or appetizing, it is gratifying that public institutions devoted to research and to the dissemination of useful information are recognizing the growing demand for popular instruction in the identification of edible and poisonous mushrooms.

One of the most recent pamphlets devoted to this subject is from the Illinois State Laboratory of Natural History.⁸ There is an introductory chapter treating in a simple and clear manner of the nature, structure, life-history, ecology, etc., of the fleshy fungi, with a few suggestions as to their collection and preparation for the table. Between 50 and 60 species are described and illustrated by photographs. The arrangement of descriptive text and illustrations is such as to make the work very convenient for practical use by the amateur, and it is to be hoped that the effort of the author will succeed in still further stimulating interest in this group of fungi, often despised under the name of "musheroons," and in leading its users to the desired knowledge of a satisfactory number of edible and poisonous kinds. Following the introductory chapter, two pages generally are devoted to a single species, one page to the descriptive text, and the opposite page to the photograph. As one reads the text the eye easily turns to the photograph in which most of the specific features can be verified.

The photographs are in general good, for many of the specific as well as the generic characters are brought out in detail. To the reviewer, however, they seem to lack the finish and excellence which should be obtained from these plants. Whether this is due in all cases to a lack of care in the original photographs, or to faulty reproduction, is uncertain. The background in a number of cases is unnecessarily spotted, and in general the photographs appear "flat" and not well shaded. It is perhaps a matter of taste in which there may be reasonable differences of opinion, but it would appear preferable that the scale in the photograph should not occupy such an obtrusive position as it does in covering up parts of the plants, when it would serve as good a purpose if placed by the side.

It appears that a few of the plants are not correctly named. For example, pl. 137 does not appear to be *Clavaria cristata*; pl. 119 is probably all *Craterellus cantharellus*; pl. 113 does not resemble *Pholiota squarrosa*, but rather a *Hypholoma*, related to or identical with *H. lachrymabundum*. The omission of *Amanita "muscaria"*, a very poisonous species of wide distribution, should be noted.

—GEO. F. ATKINSON.

⁸ McDougall, W. B., Some edible and poisonous mushrooms. Ill. State Lab. Nat. Hist. Bull. 11:413-551. pls. 85-143. 1917.